

Long Island Botanical Society

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Rediscovering Ancient “Ghost Forests” on Eastern Long Island, New York

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Atlantic white cedar (*Chamaecyparis thyoides*) is an evergreen tree with scaly leaves that occur in a flat fern-like appearance (Figure 1). It is adapted to acid, wet, lowland sites within 200 feet elevation of sea level and occurs in a narrow band along the Atlantic coast in very dense, pure stands. Long Island populations of Atlantic white cedar will be the program topic of the LIBS meeting in October.

Observations at Montauk Point

While teaching *Long Island Geology* at Stony Brook University, more than 25 years ago, Steven Englebright found chunks of peat washed onshore during field trips to Montauk Point. The flat peat chunks had been rounded by wave action as they tumbled through Montauk's boulder fields, being constantly battered by waves. The black and dark-brown peat deposits had washed onto the north shore of Montauk Point, east of False Point and the six present-day, low-elevation ponds.

Laboratory examination of the peat revealed the remains of plants, including leaves, grasses or sedges, and pieces of tree trunk. Some of the washed-ashore peat was attached to tree roots. The tree-trunk remains were identified as Atlantic white cedar, and brought to a carbon-14 dating lab at SUNY-Stony



Figure 1. *Chamaecyparis thyoides* (Atlantic white cedar) [USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner's Sons, New York. Vol. 1: 65.]

Brook. We report for the first time on the age of the white cedar wood samples: 4700 ± 300 years.

This discovery prompts our attempt to reconstruct the geological and ecological history of Montauk Point beginning approximately 4500 years ago.

Additional Observations at Montauk Point

In the early 1980s, during a very low tide just off the north shore of Montauk Point, Eric Lamont observed a few tree stumps extending approximately 3-7 inches above the ocean's surface. Eric was told by Gil Raynor, one of Long Island's premier naturalists during the mid-to-late 1900s, that the stumps were Atlantic white cedar. The independent observations of Englebright and Lamont correspond to the same locality at Montauk Point (Fig. 2).

From the 1980s to 2010, Eric revisited the Montauk site numerous times but never again observed the tree stumps; either the tide was too high or the stumps were covered with sand and gravel. In early August 2011, Eric made plans with LIBS member Larry Liddle to visit the site and hopefully take photographs of the stumps for this article. Larry determined that the lowest tide would occur during late afternoon on 30 August. On 21 August, Larry led a field trip to Montauk Point

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Long Island Botanical Society

Founded: 1986
Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.

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www.libotanical.org

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Society News

A digital archive of Larry Liddle's Inventory of the Seaweeds of Lake Montauk is now available on the East Hampton Town website <http://www.town.east-hampton.ny.us> using the search term, "algae." The first report on this project appeared in the Summer 2010 issue of the LIBS newsletter.

The most recent issue Journal of the Torrey Botanical Society features a paper on the occurrence of southern species of *Magnolia* in North Shore Long Island oak forests, authored by four LIBS members: Andy Greller, Lois and Al Lindberg, and Maureen Levine. Reprints are available upon request.

LIBS members who have an idea for a program or field trip are urged to get in touch with Rich Kelly or Mike Feder as they are presently planning programs and field trips for 2012. Their contact information is in the sidebar.

LIBS president Eric Lamont urges members to attend a very special upcoming program by Bob Gibbons who has been described as "one of Britain's best naturalists." He has written about 35 books to date, on many aspects of natural history and photography, including several floras, an acclaimed field guide to dragonflies, several field guides to insects, a guide to the National Parks and wild places of Europe, guides to the wildlife sites of France, Greece, and many more. His most recent book on "the most flowery places in the world," will be published in October 2011, as *Wildflower Wonders of the World*.



LIBS T-shirts & Sweatshirts are once again available for a limited time. They can be picked up at monthly meetings. The cost is \$15 for T-shirts and \$25 for sweatshirts. For more information, contact Mary Laura Lamont at 631-722-5542.

Join LIBS today!

Annual Membership is \$20 payable to:

Long Island Botanical Society

Mail your dues to:

Carol Johnston

LIBS Treasurer

347 Duck Pond Road

Locust Valley, NY 11560

NOTE:

Membership renewals are due in January

(Ghost Forest cont. from cover)



Figure 2. Location of the Atlantic white cedar "ghost forest" at Montauk Point.

to teach about seaweeds, but he noted that no tree stumps or peat were visible offshore during low tide.

Then, on 28 August 2011, Hurricane Irene entered Long Island waters and pounded the south fork. Montauk Point experienced extensive erosion; strong wave action powered by the hurricane removed tons of sand and gravel that had accumulated on top of the tree stumps and peat deposits. On 30 August, Eric and Larry were fortunate to observe and photograph the exposed remnants of the former white cedar swamp, including upright tree stumps, extensive peat deposits, and white cedar limbs and branches embedded in the peat (Figures 3 and 4).

Discussion

Based on these observations and measurements, we conclude that a sizable, well-preserved peat deposit, with Atlantic white cedar tree stumps in it, occurs in relatively shallow water (less than 6 feet deep at mean high tide) off the north shore of Montauk Point. Furthermore, sometime during the past 4500 years, this off-shore locality provided suitable habitat to support an Atlantic white cedar swamp. Rising sea level flooded and destroyed the swamp but part of the peaty ecosystem remains today: the existing six, low elevation, freshwater ponds (Figure 2) and associated marshes, all with peaty substrates, are part of the same landscape that once also included the white cedar swamp.

The remains of a permanently flooded Atlantic white cedar swamp in shallow ocean water off Montauk Point are an

indicator of sea level rise. And as will be explained in the next example of an ancient "ghost forest," rising sea level directly impacts the freshwater hydrology of adjacent coastal lands on eastern Long Island.



Figure 3. Larry Liddle examines an Atlantic white cedar log embedded in the peat at Montauk Point. [Photo by E. Lamont.]



Figure 4. Atlantic white cedar branch protruding from the peat at Montauk Point. [Photo by E. Lamont.]

Hubbard Creek Marsh

A second Atlantic white cedar "ghost forest" was discovered by Steven Englebright in a shallow salt marsh pond just west of Hubbard Creek in Hubbard County Park, Suffolk County. Relatively large, fallen white cedar trunks are covered with salt marsh sediments and are best observed during low tide. Three ponds, now very brackish, occur in the marsh; two of them, including the one that once supported the white cedar swamp, are adjacent to the upland that is dominated by a pitch pine-

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(*Ghost Forest cont. from pg 31*)



Figure 5. Steve Englebright shows submerged Atlantic white cedar stumps to LIBS members at Hubbard Creek. [Photo by E. Lamont.]

oak forest. Flanders Bay borders Hubbard marsh on the north; the bay is relatively shallow, averaging less than 10 feet in depth. Unlike the Montauk site, Hubbard marsh is more protected from violent storms and strong wave action.

The Hubbard marsh site is probably not as ancient as the Montauk site and might provide insight into how the Montauk site once appeared. Thus, the Hubbard marsh site can be interpreted as being a transitional stage between the 4000-plus-year-old Montauk site and extant coastal white cedar swamps that occur nearby.

Seven LIBS members visited this site recently in the company of Steve Englebright in order to see the “ghost forest” near the mouth of the creek (Figures 5 and 6).

An extensive ecosystem of extant Atlantic white cedar swamp forest occurs in Sears-Bellows Pond County Park, less than one mile south of Hubbard marsh and its “ghost forest.” The entire upland region is dominated by pitch pine-oak forest and Hubbard Creek still connects the extant white cedar swamps with their ancient but extirpated predecessor.

Discussion

We interpret the white cedar “ghost forest” at Hubbard Creek Marsh within the context of sea level rise, thus directly linking geological and ecological events at Montauk Point with the Hubbard Creek Marsh region. Both sites are examples of coastal landscapes that have been receding during the past 4700 years as a result of sea level rise.

In past geologic time when sea level was lower than today, Flanders Bay did not exist as an open body of salt water; rather it was a much narrower extension of the Peconic River, which currently empties into the bay approximately three miles to the west. At that time, the land we currently call Hubbard Marsh was upland, and the three current ponds were freshwater and hydrologically connected to Hubbard Creek which emptied into the Peconic River one to two miles further north. At that past time, several thousand (but less than 4700) years ago, the landscape at current Hubbard marsh must have resembled current day Sear-Bellows Pond Park with its coastal plain ponds and Atlantic white cedar swamps nestled within an extensive pitch pine-oak forest. As sea level rose, the ecosystems migrated landward, and that is why today we find a former white cedar swamp in a salt marsh bordering a shallow salt water bay.



Figure 6. Submerged Atlantic white cedar stump in Flanders Bay at the mouth of Hubbard Creek. [Photo by E. Lamont.]

Ideas for Future Research:

The fresh water aquifer that underlies coastal Long Island is directly impacted by sea level rise. As sea level rises, the adjacent freshwater lens also rises and coastal ecosystems migrate inland. Implications of continued and accelerated sea level rise are evident. But we, in this article, have just scratched the surface of the complex processes that have shaped and continue to shape coastal Long Island. It is our hope that this paper will inspire more research in this field that will either support our conclusions or offer new theories that better explain our observations. Pollen studies at and adjacent to our study sites are a logical first step in understanding past geological and ecological events in the region. A map of offshore peat deposits at Montauk Point is another suggested research project. Finally, we desire to impress upon policy-makers at Suffolk County and New York State parks departments, just how biologically rich and geologically complex these two sites are, and we hope that they will support research projects in these parks.

Editors' note: Those interested in background reading on this topic might consult this very thorough treatment: Laderman, A.D. 1989. The ecology of the Atlantic white cedar wetlands: a community profile. U. S. Fish Wildl. Serv. Biol. Rep. 85 (7.21). 114 pp. This document may be accessed online at <http://www.nwrc.usgs.gov/techrpt/85-7-21.pdf>

What Happened to the Atlantic White Cedar Swamp on Plum Island, New York?

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From 2002 to 2008, we conducted a floristic study of the vascular plants of Plum Island, off the end of Long Island's North Fork, and are now preparing our findings for publication. When we took our first boat ride across Plum Gut to the island, we had no idea what we would find because few botanists had previously been there. But through the years, the island eventually revealed its botanical treasures to us. We learned that Plum Island provides habitat that supports 40 species of rare, protected, and noteworthy vascular plants, including 16 listed as "State Endangered or Threatened," four as "State Rare," 17 as "Exploitably Vulnerable," and three as "Rare on Long Island." Based on this data, Plum Island is among the 10 to 12 most diverse regions in New York State for rare plants (Steve Young, personal communication).

Before initiating our field work, we were aware of an obscure report by Roy Latham on the occurrence of an Atlantic white cedar swamp on Plum Island. Latham's report, published in *Engelhardtia* (1969), consisted of a short side-note in an article on the status of the osprey on eastern Long Island. Latham wrote: "In 1909, fortifications were built on Plum Island. The laborers working on that project developed a liking for Osprey eggs. The nests, situated on the ground and in low trees, as well as in the island's big white cedar swamp, were very accessible."

We also were aware of a voucher specimen of Atlantic white cedar, *Chamaecyparis thyoides*, collected by Norman Taylor in 1915 from Plum Island. The herbarium collection, consisting of tree bark, is located at Brooklyn Botanic Garden and includes the following annotation by Taylor: "a good sized grove of dead trees."

And so it was with this foreknowledge that we ventured on to Plum Island in search of plants. It didn't take long to realize that there were no living Atlantic white cedars on the island, but we did find partially submerged tree stumps along the northwestern edge of an extensive freshwater wetland. And although we did not collect or identify wood samples, we speculate that the stumps are the final remains of the island's former white cedar swamp.

Historical and recent aerial photographs of the island's large freshwater wetland indicate that it had been anthropogenically altered in the past (Steve Young, personal communication),

probably before Taylor's 1915 collection because the white cedar trees were already dead by then. Parallel strips of dry land traverse the wetland from east to west.

A clue that may shed light on the origin of this disturbance can be found in an article by Charles Allen (1892) entitled "Breeding habits of the fish hawk on Plum Island, New York," published in *The Auk*. Allen wrote: "I paid my first visit to this island home of the Fish Hawks in May, 1879. In the swamp near the Fish Hawk's nests was a colony of Night Herons, nesting in the smaller trees near the swamp." Allen went on to describe the swamp as consisting of "partly clear water, partly boggy and overgrown with bushes, across which was a much used causeway, called Love Lane."

Allen (1892) described a man-made "causeway" that traversed the swamp with osprey nests, the same swamp that Latham (1968) described as once supporting a grove of Atlantic white cedar. We speculate that the earthen causeway was probably constructed by Richard Jerome, who by 1834 owned the entire western half of Plum Island and used the land for agriculture and raising cattle. Construction of the causeway most likely altered the natural hydrology of the white cedar swamp, but we have found no documentation stating exactly when the causeway was constructed.

Our personal observations of other white cedar swamps on Long Island suggest that these ecosystems can tolerate extended periods of drought but cannot tolerate prolonged years of flooding. Construction of the causeway through the middle of the swamp on Plum Island may have caused prolonged flooding of the white cedars resulting in a slow death. By 1915, the island's Atlantic white cedar swamp was still standing, but as Taylor reported, it consisted of a grove of dead trees.

References Cited:

Allen, C. S. 1892. Breeding habits of the fish hawk on Plum Island, New York. *Auk* 9:313-321.

Latham, R. 1969. The status of the osprey at Orient, Long Island. *Engelhardtia* 2:3.

Report on the 2011 Finding of *Houstonia pusilla* Schoepf and *Oxalis exilis* A. Cunn. at two New York State Parks on the South Shore of Long Island.

by Andrew M. Greller¹, PhD. and Garrett Herth²

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The following is a chronological account of the discovery of two species. The first, *Houstonia pusilla* Schoepf is new to New York State; the second, *Oxalis exilis* A. Cunn. appears to be new to the United States. The first identification of *Houstonia pusilla* was in 2010, by Garrett Herth, at Heckscher State Park, Town of Islip, Suffolk County, New York. This report is mainly based on the discovery by the first author of the two species at Jones Beach State Park, Town of Oyster Bay, Nassau County, New York. Taxonomic references are USDA-NRCS Plants Database and Stace et al. (2005).

On April 15, 2011, at Jones Beach State Park, the first author sighted two plants new to him. These he determined to be *Houstonia pusilla* (tiny bluet) and *Oxalis exilis* (least yellow sorrel). Geographical coordinates of these sightings are: 40°35'59.31"N to 40°35'51.25"N and 73°28'46.24"W to 73°29'31.64"W. *Houstonia* occurs in populations varying from a few dozen to hundreds, scattered on the south shoulder of Ocean Parkway for nearly the entire length of Zachs Bay, Jones Beach Island. *Oxalis* is confined to three separate locations in that area; populations number from a few to perhaps ten individuals. The habitat is the grassy right-of-way of Ocean Parkway. This habitat appears to be man-made (anthropogenic), where topsoil was deposited and mowing and fertilizing take place on a regular basis.

On April 17, 2011, the first author sent this e-mail message to Eric Lamont (Co-Chairman of the Flora Committee of the Long Island Botanical Society), Steve Glenn (Taxonomist, NYMF Project, Brooklyn Botanic Garden) and Steve Young (Taxonomist, New York State Department of Environmental Conservation):

"I was out at Jones Beach, Friday, April 15th, walking along the right-of-way of Ocean Pkwy just east of Lot 6. I found what I think are two species new to the flora of LI (maybe to NYS). They are, as best as I can determine from photo matchups, *Oxalis exilis* (European) and *Houstonia pusilla* (sometimes listed as *H. minima*, native US south and west of NYS). Here are some photos of mine along with some I pulled down from the web. See what you think."

On April 22, 2011, 4:51 PM, Garrett Herth wrote to Eric Lamont:

"Last year [2010] I contacted you about seeing Little Bluets (*[Houstonia] [pusilla]*) at Heckscher State Park...Well [they're] in bloom again [today] and I think the ...[USDA] [P]lants [D]atabase

should include Long Island... in their native range...They're in the 2 or 3 medians near the r/c airplane field. I almost overlooked them since [they're] so small."

Subsequently, the first author checked the on-line atlas of New York State plants and found that *Houstonia pusilla* was not recorded for New York State (Weldy and Werier 2011) nor does it appear in the PLANTS Database (Figure 1). See also Figure 2.

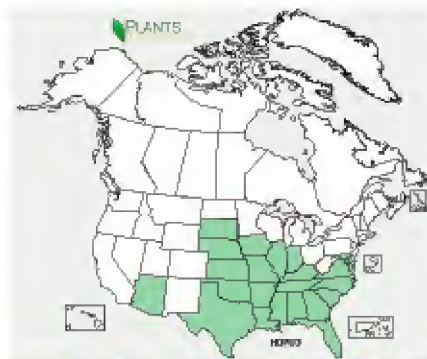


Figure 1. USDA Plant Database Range map for *Houstonia pusilla*.



Figure 2. *Houstonia pusilla* at Heckscher State Park on April 23, 2011. [Photo by G. Herth]. Plants are ca. 3 cm tall.

On April 19, 2011, the first author returned to Jones Beach State Park and made collections of *Houstonia pusilla* from two locations (40°35'57.51"N/73° 28' 55.70"W and 40° 35'18.18"N/73° 33'26.82"W), and a collection of *Oxalis exilis* at one location (40° 35'51.50"N/73° 29'27.54"W). These specimens were deposited at the Brooklyn Botanic Garden on May 4, 2011.

Oxalis exilis is described by Stace et al. (2005) as follows. Diagnostic features: Differs from *Oxalis corniculata* in filiform stems and all parts smaller. Leaves always green. Inflorescences always 1-flowered. Usually 5 stamens with and 5 without anthers. Capsule 3-4.5mm. Seeds 2-4 per cell. Habitat: Introduced-naturalized. Distribution: Similar places and distribution to



Figure 3. *Oxalis exilis* at Jones Beach State Park on April 19, 2011. [Photo by A.M. Greller.]

FIELD TRIPS

OCTOBER 1, 2011 (SATURDAY) 10 AM

Hempstead Plains, Nassau County, NY

Trip leader: Betsy Gulotta Cell: (516) 317-7267

Over 200 species of native and non-native flowering plants have been identified at the 19-acre Hempstead Plains at Nassau Community College (NCC). The native grasses characterizing the tall grass prairie are particularly beautiful at this time of year. The walk takes about an hour. Bring water and sturdy shoes.

Directions: From either Meadowbrook Parkway Exit M4 or Merrick Ave. north of Rt. 24 Hempstead Turnpike, take Charles Lindbergh Blvd west. Turn at first right into East Parking of NCC. Go to first intersection. See parking along fence and sign for Hempstead Plains.

OCTOBER 15, 2011 (SATURDAY) 10 AM

Caumsett State Historical Park, Suffolk County, Long Island, NY

Trip leader: Dr. Andrew Greller

Email: agreller2@optonline.net

This is an all-day trip. We will explore for fall flora and identify oaks and hickories. Bring plenty of beverage, lunch, insect repellent, and sturdy footwear. Camera, binoculars and hand-lens are optional but recommended. (This is a joint trip with the Torrey Botanical Society.)

Directions: Meet at the parking area after the entrance booth (NYS Park fee may be applicable). *By car only:* From New York City take the Long Island Expressway to exit 36 toward Seasingtown Rd/Port Washington; merge onto Nassau Blvd/S Service Rd; turn left at Seasingtown Rd; continue north about 1 mile (to the end), and turn right at 25A E/Northern Blvd/North Hempstead Tpk; continue east on 25A for 14.5 miles and turn left at West Neck Rd, Huntington; continue north on the winding West Neck Rd for 4.4 miles until you find yourself bearing sharply right onto Lloyd Harbor Rd; continue on Lloyd Harbor Rd until you see the sign for Caumsett State Park (on your right); turn left at the sign for the park and continue up a hill after which the road will veer to the right. Go past the guard house and you'll see a parking lot on your right. From eastern Long Island take LIE to Route 110 Huntington; go north until you reach Main Street (Route 25A) in Huntington - make a left; on the third block from your turn (about 400 yards distance), make a right turn onto West Neck Rd. Follow directions as above.

Oxalis corniculata, usually but not everywhere less common; New Zealand and Tasmania.

In Figure 3 all ten filaments bear anthers, although the anthers of the outer whorl appear to be smaller than those of the inner whorl. Nevertheless, we are convinced that we have discovered two plants new to the flora of New York State and, in the case of *Oxalis exilis*, new to the United States.

Acknowledgements

The authors thank Eric Lamont for his encouragement of the preparation of this report and for detailed instructions on documenting the discovery of these two new plants. We also thank Steve Glenn for checking the determination of *Houstonia* and for providing another contact for the taxonomy of *Oxalis*.

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Stace, C., R. van der Meijden and I. de Kort (eds.). 2005. Interactive Flora of NW Europe. <http://wbd.etibioinformatics.nl/bis/flora.php?selected=beschrijving&menuentry=soorten&id=3158> Accessed on May 10, 2011.

USDA, NRCS. 2011. The PLANTS Database (<http://plants.usda.gov>). National Plant Data Team, Greensboro, NC 27401-4901 USA. Accessed on May 10, 2011.

Weldy, T. and D. Werier. 2011. New York Flora Atlas. [S. M. Landry and K. N. Campbell (original application development), Florida Center for Community Design and Research, University of South Florida]. New York Flora Association, Albany, New York.

(Upcoming Programs, cont. from page 36)

December 13, 2011* Tuesday, 7:30 PM

Member Night: Members are welcome to bring photos, stories, specimens, and tales of peculiar sightings of favorite plants. A great opportunity to show what you have found while exploring on Long Island or elsewhere. Please call Rich Kelly (516-354-6506) in advance to advise as to the approximate number of images/slides that you would like to show and preferred medium of presentation. Thanks.

Location: Bill Paterson Nature Center, Muttontown Preserve, East Norwich

Reminder - no meetings in January or February. Next meeting March 13, 2012.

For all programs:

* Refreshments and informal talk begin at 7:30 p.m.

Formal meeting starts at 8:00 p.m.

Directions to Muttontown or Stony Brook: 516-354-6506

UPCOMING PROGRAMS

October 11, 2011* Tuesday, 7:30 PM
John Turner: "Atlantic White Cedar: Notes on its Historical and Current Status on Long Island." Atlantic White Cedar is one of the Island's most iconic trees. This program will discuss the historical abundance and current distribution of Atlantic White Cedar on Long Island and opportunities for potential reintroduction. John is a naturalist, conservationist, and writer whose 2nd Edition of "Exploring the Other Island: A Seasonal Guide to Nature on Long Island" has recently been published. He is also founder and president of Alula Birding & Natural History Tours, a nature tour company connecting people with the natural world, and a co-founder and past board member of the Long Island Pine Barrens Society.

Location: Museum of Long Island Natural Sciences, Earth and Space Science Building, Gil Hanson Room (Room 123), Stony Brook University, Stony Brook

November 8, 2011* Tuesday, 7:30 PM
Bob Gibbons: "The Most Flowery Places in the World." The talk will take viewers on a tour of some of the most spectacular flower displays on the planet, showing some of the flowers and landscapes to be found at each location and discussing what makes some places so exceptionally flowery. Some of the ups and downs involved in the work to find these places will be revealed, and there will be photographs of some of the special animal life that can be found there. All will be illustrated with a selection of photographs of the highest quality. Dr. Bob Gibbons became a freelance author, photographer, lecturer and tour leader after spending 15 years or so in nature conservation in Britain. He has written and illustrated over 30 books, and led hundreds of botanical or natural history tours all over the world, including a number for the New York Botanic Garden. This talk follows part of the work involved in producing his latest book "Wildflower Wonders of the World."

Location: Bill Paterson Nature Center, Muttontown Preserve, East Norwich

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